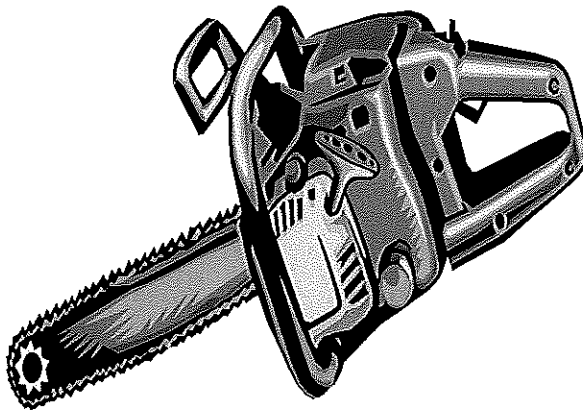


OUTDOOR EQUIPMENT SAFETY



FOR COMMERCIAL AND
GOVERNMENT OPERATIONS

Appendices

Inspection-Riding Lawnmowers
Outdoor Equipment Hazard Checklist
Daily Tractor Safety Checklist
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PTO Shaft Shield/Warning Triangles
Clothing When Mowing
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Safe Chainsaw Operation
Chain Saw Kickback Hazard-Consumer Product Safety Commission
Riding Lawnmowers-Consumer Product Safety Commission
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INTRODUCTION

Many employees, both commercial and government, use power tools to shape and maintain landscapes including lawn mowers, chain saws, string trimmers, leaf blowers, and chipper/shredders. Accident and injuries that occur while working outside with outdoor power tools can easily be prevented with a few safety precautions and careful attention while operating these machines.

GENERAL

*Before using any tool or power equipment, read and follow the manufacturer's instructions. Each employee, after reading each appropriate operator's manual, should sign documentation that he/she read and understood the information.

*Always wear safety glasses to prevent eye injuries.

*Always wear safety shoes to prevent foot injuries.

*Wear snug fitting clothes that still allow movement. Be aware that loose sleeve cuffs, pants cuffs, scarves, loose long hair, skirts or jewelry can get caught in cutting blades or other moving parts.

*Never alter any tool or remove safety features such as grounding pins or blade guards.

*Wear hearing protection devices while operating gasoline-powered equipment, such as lawn mowers, leaf blowers, snow blowers or chain saws.

*Keep blades on cutting tools sharpened. Keep handles clean of water, dirt, and oil.

*Never work alone. Workers must always be able to contact someone quickly for help in the event of an emergency.

*Each outdoor work crew shall have a first aid kit and drinking water.

*Never power use power tools and equipment while under the influence of alcohol, drugs or any medicines that can impair their vision, alertness, dexterity or judgment.

ELECTRIC TOOLS IN GENERAL

*Always check for frayed or damaged power cords before every use. Always make sure the cords are in good condition.

*Never allow tools to get wet unless they are marked "immersible." Never allow them to use electrical equipment while it is raining.

*Before plugging in any appliance or tool, always check to make sure that the power switch is in the OFF position.

*Never carry a tool by the cord or yank on the cord to unplug it. Always pull on the plug and not the wire when disconnecting the cord.

*When tools are not in use, they should be unplugged. Extension cords are to be coiled up and stored for safety.

*All outdoor electrical outlets are to be protected with ground fault circuit interrupters.

Attachment One contains an Outdoor Equipment Hazard Checklist to be use by supervisors to identify unsafe work practices.

LAWN MOWER SAFETY INTRODUCTION

Four types of lawn mower accidents cause the majority of injuries:

Contact with rotating blade.

Propelled objects. Rocks, glass, and wire are hurled at initial speeds above 170 miles per hour. Objects may be thrown 50 feet or more, causing death and injuries ranging from blindness to severe bruising.

Overturning. This type of accident occurs primarily when riding mowers are used on steep slopes or embankments. Victims may be pinned under the mower or come into contact with the blade.

Riding mowers running over the victim. Accidents occur if the operator fails to look when backing a riding mower. Playing children are also at risk and can be seriously injured. Also, an operator can pull a lawnmower backward over his or her foot.

LAWN MOWERS (PUSH AND RIDING)



*Always wear work shoes while mowing—even on riding mowers. Do not wear loose clothing that can catch in moving blades.

*Do a thorough area inspection to remove sticks, trash, rocks, etc. before mowing.

*Adjust cutting height before starting mower.

*After rain or heavy dew, wait for the grass to dry before mowing. Wet grass may clog the chute or make you and the equipment slip.

*Turn off mowers or disengage the blade before crossing drives or walkways. **NEVER LEAVE A RUNNING MOWER UNATTENDED.**

*If the chute clogs, shut off the motor, wait for the blade to stop turning, then clear it with a stick. **NEVER CLEAR A CHUTE WITH YOUR HANDS.**

*Do not cut grass at dusk or in dim light.

*Stay in the “Operator Safety Zone”—the area directly behind the push lawn mower.

*Operate a mower with both hands on the handle or steering wheel.

*Never pull a lawn mower backward or toward you.

*Never allow passengers on a riding lawn mower.

*Never modify or remove any item of equipment on a mower.

*Never push or drive a mower over gravel, stones or hard, immovable objects like pipes, rocks or sidewalk edges.

*Mow across a slope with a push mower and up/down the slope with a riding mower. While riding uphill, lean forward on the mower to prevent the front wheels from lifting off the ground. Do not cut grass on any slope greater than 15 degrees. (See Figure 1)

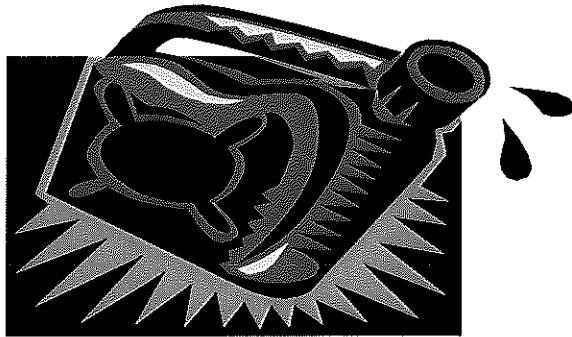
*Keep mowers well maintained. Replace any work wheels, handles and/or safety guards and equipment.

*All employees and visitors should be out of sight of the mower to prevent injuries due to flying objects or debris.

*All employees are to be properly trained in safe mower operation, in addition to instruction on the operation of the mower.

*Fill the tank before starting the job. Refuel mowers outdoors. NEVER REFUEL when the motor is still hot-wait two or three minutes (or more if necessary) before adding fuel to the tank.

*Wipe off any excess fuel that spills on the mower casing.



CHAIN SAWS



*Make sure there are no nails in the wood or loose objects in the area to be cut.

*Before using a chainsaw, inspect the blade sharpness, chain tension, idlespeed, nuts and screws, and lubrication to make sure everything is set according to the manufacturer's instructions.

*Use a saw equipped with a chain brake, anti-kickback chain or other anti-kickback devices.

*Before starting the engine, make sure the saw is not in contact with anything.

*Do not drop start a chain saw.

*Make sure to have a secure footing before making any cut.

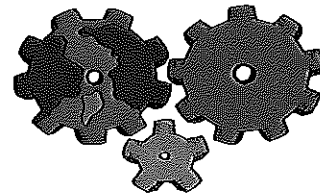
*Be sure that your body is clear from the natural path the saw will follow when the cut goes through the wood.

*Do not cut above mid chest height.

*Use both hands to operate the chain saw.

*Cut with the lower part of the saw blade, not the tip of nose. (See Figure 2)

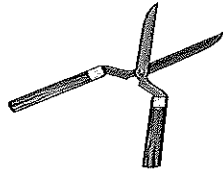
CHIPPER/SHREDDERS



*Do not stand in front of the discharge shoot while loading, operating or repairing a chipper/shredder.

*If the machine becomes jammed, turn it off and wait for all moving parts to stop before attempting to fix it.

*Keep a pair of loppers close at hand if necessary to trim branches that refuse to slide down the chute—however, be sure to keep them away from the intakes and do not allow them to take your attention away from a running machine.



WEED TRIMMERS



*When using a string or blade trimmer, wear long pants to protect legs from rocks or sticks.

*Wear safety shoes or boots to protect feet.

*Do not use a string or blade trimmer on poison ivy, as it will spread foliage and stems over your body, which could cause a massive allergic reaction.

OTHER OUTDOOR HAND POWER TOOLS

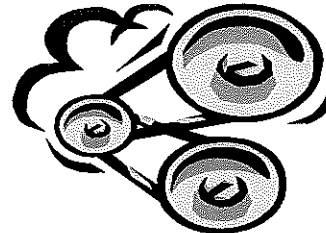
When using electric hedge clippers, always keep both hands on the handle.

*Keep arms within a comfortable distance to prevent strain or loss of control.

*Take breaks when hands or arms get tired.

*Wear gloves, eye protection, hearing protection, safety foot boots, and long pants.

*Know the capabilities of the equipment.



TRACTORS



*Know the capacity and operating characteristics of the tractor and all the attachments and implements that will be used.

*Only use attachment and implements that are properly matched to the tractor.

*Read and understand all appropriate operators' manuals. Never allow unqualified persons to operate a tractor.

*Before dismounting, always disengage the power take off (PTO), lower all attachments and implement to the ground, place tractor in park, engage the parking brake, and shut off the engine.

*If the tractor is to be unattended, cycle hydraulic controls, and remove the ignition key.

*Never modify or remove any part of the equipment.

*Buckle-up the safety belt (if equipped with a roll over protective structure-ROPS) before starting the engine. If the tractor is equipped with ROPS, follow the manufacturer's specific instructions for safety belt use and equipment maintenance. (See Figure 3)

*Keep other employees and visitors away during operation—No riders should be allowed on a tractor.

*Where possible, avoid operating the tractor near ditches, embankments, and holes.

*Reduce speed when turning, crossing slopes, and on rough, slick or muddy surfaces.

*Stay off slopes too steep for safe operation.

*Watch where you are going—especially at row ends, on roads, and around trees and buildings.

*Operate the tractor smoothly—no jerky turns, starts or stops.

*When tractor is stopped, set brakes securely and use park lock if available.

*Use PTO stub shaft shield when implements are not attached. (See Figure 4)

*Attach the proper warning triangle to the rear of any tractor or implement to be taken on the road. (See Figure 5)



WARNING: An operator should not use alcohol or drugs that can change his/her alertness or coordination. An operator on prescription or over-the-counter drugs needs medical advice on whether or not he/she can safely operate a tractor or any other machine.

STORAGE OF EQUIPMENT AND FUEL

*Store equipment indoors, in a dry, open area, out of the reach of children.

*Do not store the equipment in an enclosed place where fuel fumes can accumulate or be exposed to an open flame, spark or pilot light.

*Store fuel and lubricants in approved containers and the containers should be stored in approved cabinets. Keep fuel and lubricants out of the reach of children.

*Always clean up any spilled fuel immediately. Move machinery away from spills before starting the engine.

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Read and recognize all safety labels on your machine. Before operating any outdoor equipment, review the operator's manual and familiarize yourself with all of the controls.

Before operating equipment, inspect the machine carefully. Replace all worn or broken parts immediately. Keep all parts in good condition and fastened in place. Tighten nuts, bolts and screws to keep equipment in safe working condition.

Avoid injury from contacting blades or trimmer line. Keep all safety devices, switches, guards and shields in place and working. Keep hands and feet away from blades, mower decks and line trimmer head when engine is running.

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Outdoor Equipment Hazard Checklist

Item	Yes	No	Priority Level	Hazard Corrected
Do employees who used outdoor power equipment always wear safety shoes?				
Do employees who mow the areas always pickup trash, debris, rocks, sticks etc. first?				
Do all outdoor power equipment have all the required safety items?				
Are grass catchers used to help prevent objects from being thrown by rotary lawn mowers?				
Do employees always turn the lawn off (or disengage the blade) before crossing drives and/or walkways?				
Do employees always refill power equipment outdoors?				
Is extra gasoline stored in a safety can?				
Do employees always disconnect the spark plug wire before tipping the lawn mower up to do any servicing under the mower deck?				
Is lockout/tagout procedures used when outdoor power equipment is being repaired?				
Are employees and visitors not allowed in the areas where grass is being cut?				
Do employees work across the slope with push lawn mowers?				
Do employees mow up and down the slope with riding mowers?				
Do employees always look to the rear before backing up a riding mower?				
Do employees make it a practice to never pull a push mower toward themselves?				
Do employees always wear hearing protection when operating outdoor power equipment?				
Do employees wear face masks when working with weed trimmers and leaf blowers?				
Do employees wear long pants when working with weed trimmers?				
Do employees take breaks when using hand power tools to rest hands and arms?				
Do employees only cut dry grass?				
Do employees use their hands to clean mower chutes.				
Do employees wear non-loose clothing when working with anytype of outdoor power equipment?				
Do employees know the capacity and operating characteristics of their tractors and the various attachments and implements being used?				

Daily Tractor Safety Checklist

Date: _____ **Tractor:** _____

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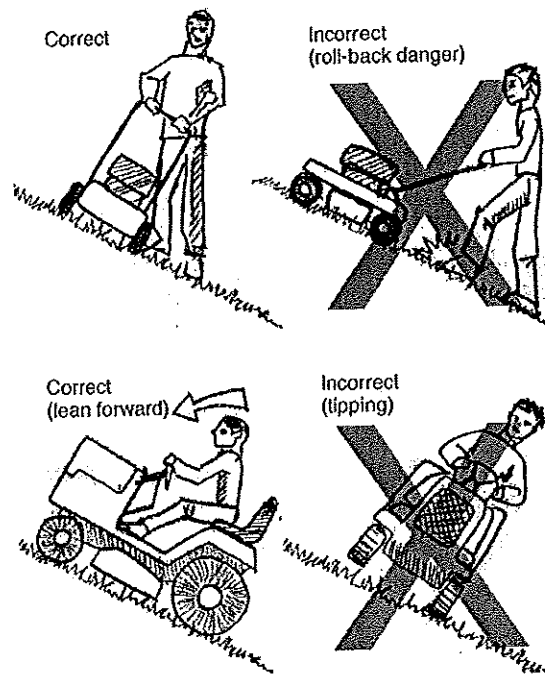


Figure 1. Mowing on slopes.

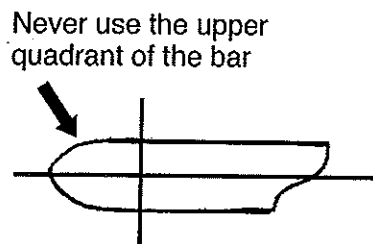
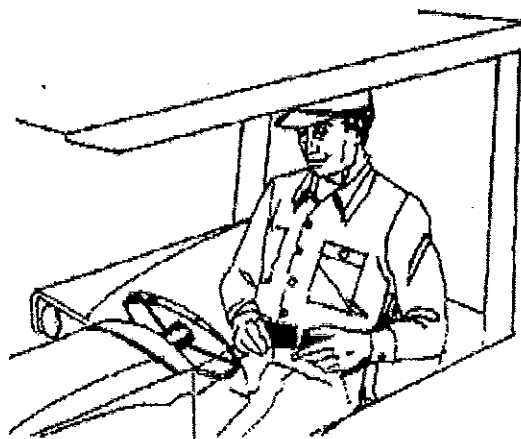


Figure 2. Cut with the lower part of the chainsaw blade, not the tip or nose.



Buckle up if your tractor is equipped with ROPS.

Figure 3. Using safety belts and ROPS.

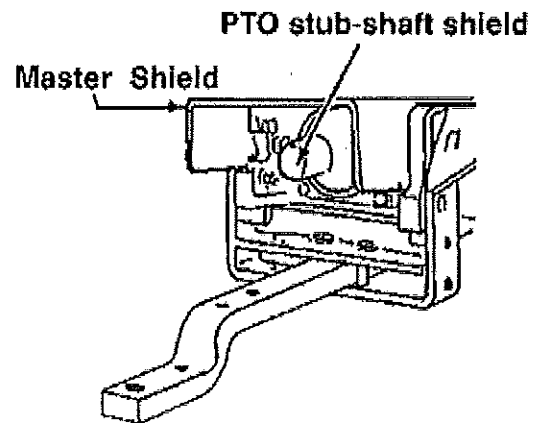


Figure 4. PTO stub shaft shield.

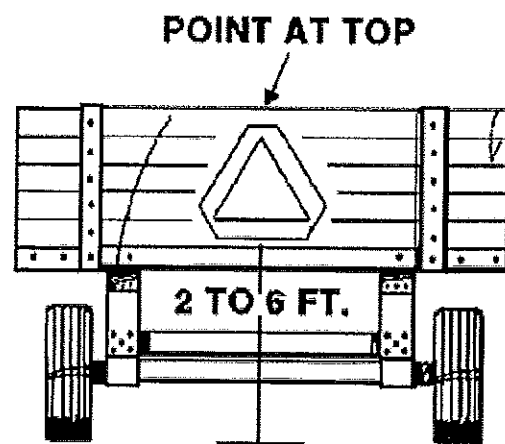
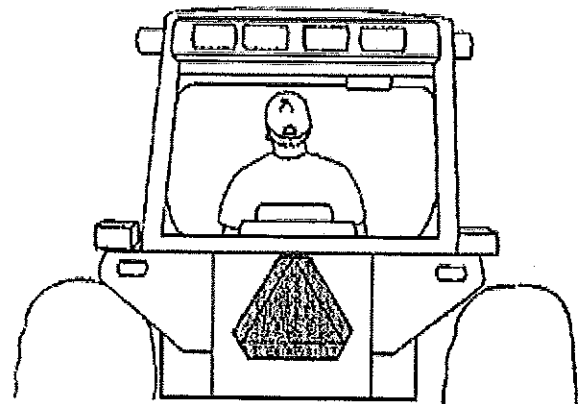


Figure 5. Proper location of warning triangles on tractors and implements using the public roads and streets.

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[Product Search](#)[Equipment Quickfind](#)**Safety - Clothing****Dress for success.**

Protect yourself from objectionable or uncomfortable, loud noises by wearing earmuffs or earplugs. Especially when operating a line trimmer, power blower or chain saw.

Loose clothing can snag on controls and get caught in moving parts. Tuck in your shirttail; avoid wearing jewelry or unbuttoned, long-sleeved shirts and keep long hair safely secured.

Wear close-fitting clothes, long pants and closed-toe shoes with traction soles for protection.

When operating lawn and garden equipment, always use full eye protection to protect yourself against flying debris.

Wear gloves with a non-slip grip when operating portable power equipment and also when servicing equipment.

ATVs

For your safety: always wear a helmet, eye protection, and protective clothing.

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[Product Search](#)[Equipment Quickfind](#)**Safety - Operation****Children should be seen, not hurt.**

Kids and power equipment do not mix. Do not allow children to operate any outdoor mowing or handheld equipment.

Remember, children like to imitate their parents. That's why it's so important to always practice safe mowing skills. For your own safety's sake, as well as the good example you set, make sure safety starts in your own backyard first.

Children and pets should be kept in the house under supervision at all times while all mowing, trimming and blowing equipment is in operation.

Do not carry children or let them ride on the machine, or any attachment, or in a cart or trailer, even when the blades are turned off.

Remove any objects or debris that might be thrown by mower or edger blades. Keep people away from the mowing and trimming area to protect bystanders from thrown objects.

ATVs

Purchasers and operators of John Deere ATVs must be age 16 or older. Learn more about the [safe operation of ATVs](#).


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Safety - Mower Maintenance



Smart Mower Maintenance.

Never run an engine when equipment is indoors. Breathing exhaust fumes can be fatal.

Keep sparks and flames away from batteries - battery gas can explode. Use a flashlight to check the battery fluid level.

Never add fuel when the engine is running or hot. Add fuel outdoors where there is plenty of ventilation.

Follow fueling and pre-mixing instructions carefully for two-cycle engines. Wipe up any fuel spillage quickly to avoid the possibility of a fire.

Shut off the engine before servicing. On electrical start units, disconnect the battery ground cable before working on the electrical system. When working on two-cycle machines, remember to turn the unit switch off and disconnect the spark plug wire.

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Storage Tips

Store equipment indoors, in a dry, open area, out of the reach of children. Don't store the equipment in an enclosed place where fuel fumes can accumulate or be exposed to an open flame, spark or pilot light.

Store fuel in an approved container. And be sure to keep fuel on a shelf out of reach of children.

Always clean up any spilled fuel immediately. Move the machine away from the spill before starting the engine.

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Safety - Landscaping



Escape the landscape pitfalls.

As you put in new plants, use any extra soil to fill in depressions and low spots. Leveling the terrain provides a smoother surface for a walk-behind mower or tractor.

Mow up and down the slope with riding equipment on hillsides - not across. Avoid sudden stops or starts.

Landscape with safety in mind. Remember that small saplings grow into large trees: be sure to leave enough space for your mower to get around a tree when it is full-grown. Avoid growing grass in tight quarters that require you to mow in reverse.

Take a careful look at hillsides. If you cannot back up the slope, or if you feel uneasy on it, don't mow the slope. Instead, plant a decorative ground cover.

Remove low-hanging tree branches that can flick an eye or knock you off balance while mowing. In addition to giving you a clear view, pruning allows sunlight to reach the grass growing near the tree.








Do not use a hedge trimmer to trim hedges higher than your shoulders.

Remove a circle of grass around the base of trees (the radius should be 1 to 3 feet, depending on the size of the tree.) Fill the circle with a soft mulch, such as shredded bark. This helps protect the tree from the mower. It also makes trimming faster and easier.











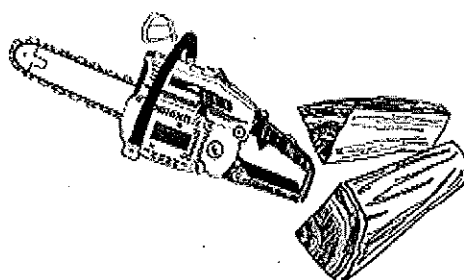
Lawn Mower Safety

Before You Start

-  Wear sturdy shoes, jeans or slacks and eye protection
-  Be sure children and pets are in a safe place and that they will stay there
-  Check the lawn for objects—toys, sticks, stones, debris, and other objects
-  Do not mow if grass is wet or a thunderstorm is in the area
-  Do not cut the grass at dusk or in dim light
-  Add fuel before you start mowing, while the engine is off and cool
-  Understand how your mower operates – read and be familiar with your owner's manual

While You Are Mowing

-  Stay in the "Operator Safety Zone" – the area directly behind the lawn mower with both hands on the handle bar or in the seat of a tractor
-  Watch the lawn in front of you for any objects you may have missed earlier
-  Never reach down to move objects out of the way while mowing – remember to keep two hands on the mower handle or steering wheel at all times
-  Never pull the mower backward or toward you
-  When cutting on a slope, mow across the face of the slope with a walk behind mower. Mow up and down the slope with a riding mower. Don't cut grass on any slope greater than 15°
-  Always turn off the mower to remove the grass catcher, unclog the discharge chute or adjust the mower deck height
-  When refueling, wait two or three minutes after the engine stops before adding fuel to the tank.
-  Never allow children to ride with you on a riding mower



Safe Chainsaw Operation

A. Scott Reed
Jack True

Contents

- ✓ Introduction
- ✓ Accident Components — Human, Agent, Environment
 - ✓ Basic Field Maintenance
 - ✓ Daily Operation Check
 - ✓ Personal Protective Equipment
 - ✓ Getting Started — Felling
 - ✓ Basic Felling Cuts
 - ✓ Removing Limbs and Bucking
 - ✓ General Operating Rules

Introduction

Chainsaws are powerful and valuable tools. They can be found on most farms and in homes where wood cut for fireplaces or heating systems. They are also the principal cutting tool for nearly half of the commercial timber produced in Minnesota.

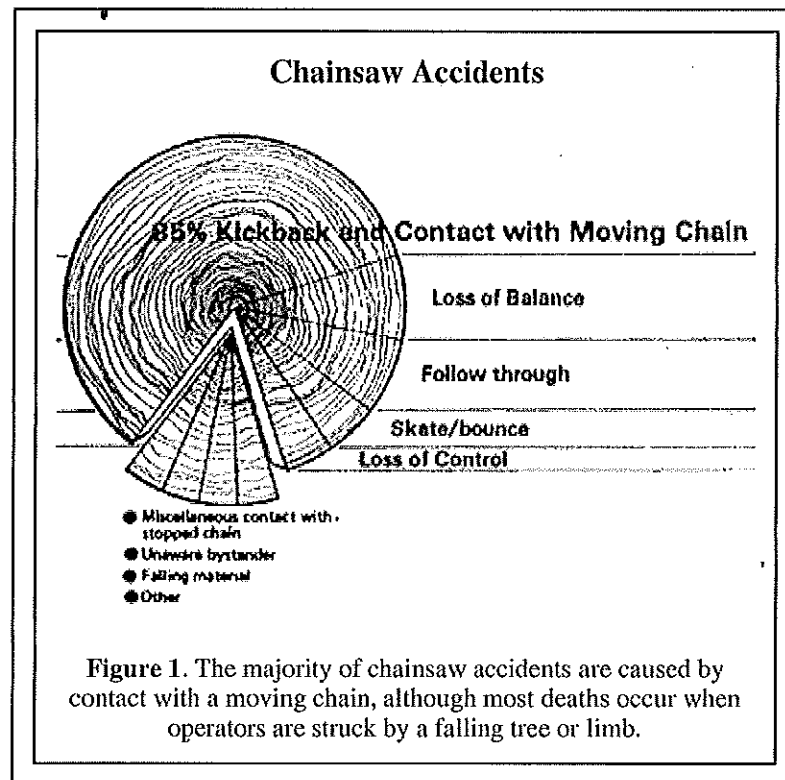
However, despite the benefits of chainsaw use, the potential for accidents while using a chainsaw is high and injuries sustained are usually severe.

The Consumer Product Safety Commission found that the number of chainsaw accidents requiring medical attention increased from 70,000 to 135,000 annually over a five-year period. These accidents appear to be

increasing at the alarming rate of 10 percent per year.

In Minnesota, fatality reports show that during a five-year period 19 people died. Seventeen, or nearly 90 percent, of the chainsaw deaths resulted from trees or branches falling on workers as they used a chainsaw.

Contact with a moving chain accounts for 85 percent of injuries to chainsaw operators. The most serious accidents involving the moving chain result from kickback. The incidence of kickback can be reduced by paying attention to the major components of an accident (figure 1).



Accident Components — Human, Agent, Environment

The **human** component refers to both the physical and mental condition of the operator. Operating a chainsaw calls for recognizing any personal limitations, including fatigue and boredom, which can reduce reaction time and increase the odds of an accident occurring.

Although the chainsaw itself is the **agent** that inflicts most common injuries, accidents also result from falling trees or dead limbs and from loss of balance, which can lead to serious falls.

Environment is the third accident component. Changing and often severe weather conditions can also increase the likelihood of an accident.

Basic Field Maintenance

Safety maintenance consists of field attention to the essential parts of a saw to

keep it in efficient and safe operating condition. The operator's manual should always be consulted for items specific to an individual saw.

A broad trigger guard and chain catchpin help protect the operator if the chain breaks or becomes otherwise disengaged. If the chain breaks or jumps the bar, the catchpin will cause the chain to bunch up, keeping it from striking the operator's right arm.

Heat from the muffler sometimes ignites gasoline or dry forest tinder near the saw. Be sure that the muffler is in sound operating condition.

When the moving chain on the tip of a bar strikes something, the bar is sometimes forced upward toward the operator (figure 2). This occurs because the teeth take an oversized bite and temporarily stall, transferring the power from the chain to the saw, which then rotates toward the operator. The saw can kick back 90 degrees in one-tenth of a second ... faster than the human brain can respond.

Most saws are equipped with a chain brake designed to stop the moving chain when the brake is engaged the operator's hand, wrist, or arm. If a kickback occurs, a stopped chain will do far less damage.

Some saws are equipped with safety-tipped bars, which attempt to keep the tip from contacting anything. Although chainsaws with safety tips are not as versatile, this safety feature can be useful for an inexperienced chainsaw user.

Older model saws frequently generate severe vibrations that can, over time, contribute to blood vessel deficiencies in operators. Handles of newer saws are mounted in rubber and vibrate much less.

Daily Operation Check

Daily examination to ensure that the saw is operating efficiently helps reduce the prospect of an accident.

Taking care of the chain is the most important, most often neglected, and most difficult feature of a daily operation check. *Sharpening* techniques can be varied with good results. However, it is important to use the proper technique for specific types of chain. Consult your owner's manual to determine the proper size file and tooth angles.

Proper *chain tension* contributes to efficient cutting and longer chain life and lessens the chance of the chain jumping the bar. For a hard-nosed bar, the proper tension should result in 1/16" to 1/8" of space between the bottom of the bar and the tie straps between the teeth. Tension for a bar with a roller or sprocket nose should be slightly tighter with binding when the chain is pulled around the bar with a gloved hand.

Chain lubrication is provided by a mechanism in the saw housing. Whenever the chain is off the bar, examine the oil port and clean it if necessary to keep the chain running coolly and efficiently. A well-lubricated chain is also less likely to jump from the bar and injure the operator.

Access to the *air cleaner* is usually provided by a thumbnut on the top of the housing. The element should be cleaned by brushing or tapping it to clear out small collected debris. Never use gasoline or other solvents.



Figure 2. A kickback can occur in less than one-tenth a second, faster than the human brain can respond.

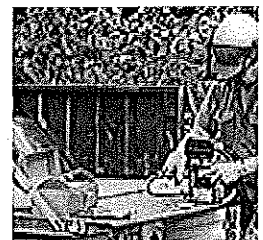


Figure 3. A field examination of basic safety features and saw components will reduce odds of an accident occurring.

because flammable residue could explode if ignited by the muffler or electrical system.

The *idle and/or clutch adjustment* must be set in such a way that the chain does not turn when the engine idles.

SAFETY FEATURES:

CHAIN CATCHER	CHAIN SHARPNESS
MUFFLER	CHAIN TENSION
CHAIN BRAKE	CHAIN OILER
SAFETY TIP (IF PRESENT)	AIR CLEANER ELEMENT
RUBBER MOUNTED HANDLEBAR	IDLE ADJUSTMENT

Personal Protective Equipment

Before going into the field to operate a chainsaw, the operator should be protected with clothing and other gear designed to reduce the severity of any accident.

The basic piece of personal protective gear is an approved *hardhat*. There are many hardhats available with attached *ear muffs*, necessary to cut the noise, and a screen-shield, which gives *eye protection* from flying debris (figure 4).

Inexpensive ear plugs are also effective for protection from high noise levels. It's important to fit them tightly into the ear canal. Safety-glass eyewear can also substitute for a screen-shield, although lack of air circulation behind the lenses frequently causes fogging during exertion.

Other protective gear should include sturdy *work boots*, *leather gloves*, and *leg chaps*. Be sure that the chaps are constructed of material designed for protection from chainsaws. Two materials commonly used, ballistic nylon and Kevlar, are designed to slow or stop the chain if it strikes your leg, allowing you slightly more reaction time.



Figure 4. Hardhats specially designed for wood cutting are now widely available. Many have devices for both hearing and eye protection attached directly to the hat.

Getting Started — Felling

Fueling and starting the saw is best done after the engine has had some time to cool after prior use. Before you fuel the saw, clear the area around and under it of woody debris and other flammable material.

After the saw is fueled, move it at least ten feet from the fueling area and be sure that the saw is firmly supported before you try to start it. Don't attempt to start the saw while you are standing and holding it unsupported because it could pivot, striking you or another object, causing a kickback as it starts.

Before making the first cut to fell a standing tree, consider various factors that can influence how, and where, you should fell it.

First, check the diameter of the tree. If it is more than twice the length of the saw bar, it requires special cutting techniques best left to specialists.

Check every tree for lean before choosing a felling direction. Trees with a slight lean are best, as the lean helps place the tree. Trees with severe lean can be dangerous to fell because the tree moves in the lean direction too quickly, splitting at the base and becoming what is known as a "barber chair." Barber chair fly upwards, striking the operator with terrific force.

The soundness of a tree can be evaluated by looking for signs of rot, including loose bark, fine "sawdust" particles at the base of the tree, or large holes in the trunk at any height. Trees usually rot from the center sometimes leaving only a shell of sound wood.

Distribution of the tree's crown can affect felling direction. Check for large limbs, snow or ice accumulation or uneven distribution of the crown. All of these factors can pull the tree in one direction.

Consider environmental factors also before choosing a felling direction. Wind is the most important environmental concern. The effect of wind is more pronounced on trees with large crowns. Avoid felling very windy days.

The general terrain in the working area should be evaluated both to gauge its effect on the felling direction and to predetermine a safe escape route to use as the tree begins to fall.

Brush should always be cleared from around the base of the tree before beginning cutting. This allows greater freedom of movement and makes it easier to move away once the tree begins to fall.

Basic Felling Cuts

All felling techniques consist of two basic cuts with the chainsaw: the undercut and the backcut. The undercut removes a wedge-shaped piece of the trunk from the side to which the tree will fall. Only one-fourth to one-third of the tree's diameter should be removed with the undercut. The backcut, made on the opposite side, lets the tree fall.

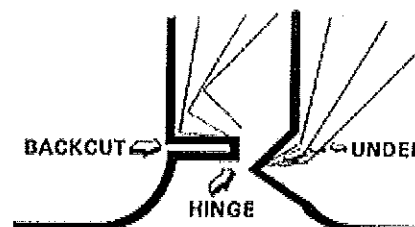


Figure 5. Each tree felled requires first undercut done on the side to which the will fall, and then a backcut. Be careful leave a "hinge" of uncut wood.

The conventional undercut is made by first sawing the lower horizontal face and then sawing the upper face down at an angle to meet it. A newer style of undercut (figure 5) uses angled top and bottom faces, which together form a 90° angle. Use the new style of undercut whenever possible because the faces of the cut do not close until the tree is on the ground, giving a longer period of control over the tree's fall. Be sure that both cuts meet precisely. If one cut travels into the trunk too far, cut the other just deep enough to meet it.

The horizontal backcut is made from the opposite side of the tree, about two inches above the "V" of the undercut. Be sure to stop before reaching the undercut. About two inches of uncut wood should remain. This uncut portion, called the "hinge," helps guide the direction of fall. It also helps keep the butt of the tree from leaving the ground and striking the operator.

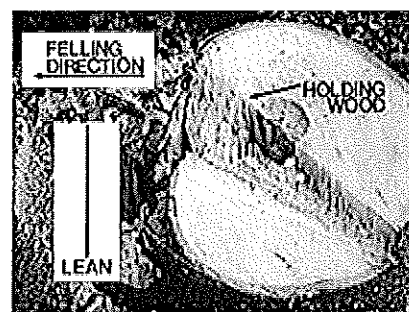


Figure 6. Use of "holding wood" can help fell a tree slightly away from its natural direction of lean.

Larger trees can sometimes be felled more easily by using wedges made of wood or plastic. The wedges are driven into the backcut behind the saw to force the tree in the desired direction.

After the tree has begun to fall, the operator should retreat in a diagonal direction from the tree, away from the direction of fall. Use a predetermined escape route and keep your eye on the falling tree for any developing problems.

One type of special felling situation consists of leaving a hinge of so-called "holding wood" that is thick on one side and is used to pull a tree slightly away from its direction of lean. Although other, more elaborate cutting techniques are sometimes used on special cases, it is best to leave them to professionals (figure 6).

Removing Limbs and Bucking

Once the tree is on the ground, the limbs are normally removed, then the tree is "bucked," or cut into smaller pieces. Fallen trees are frequently under tension depending on the way they are supported by the ground or their limbs.

Normally, a trunk will be under both tension and compression on opposite sides; the sides change based on support points. Compression wood is being squeezed and if the saw cuts too far into the compression area it will begin to close, binding the saw. Usually the compression wood is cut part way first, then bucking is completed on the tension side, which will open away from the saw as the cut deepens, because the wood fibers are being stretched.

If a trunk is supported only at one end, compression wood occurs on the lower side. In this situation, the final cut should be made from above, allowing the pieces to separate (figure 7).

Removing large limbs also requires identifying tension and compression sides. Limbs on the underside of a fallen tree may be under severe stress and should be evaluated carefully.

When working on steep hillsides, always cut from the upper side of a fallen tree, because the pieces can easily roll after bucking.

General Operating Rules

Several general guidelines help make chainsaw use more efficient and less dangerous.

First, learn to look *up* as you approach a tree before cutting. Overhead hazards can include dangerous wires, other trees, and dead and loose branches.

Saws are designed to be run at full throttle. Always accelerate the engine before beginning a cut.

Operator balance is important in controlling the saw. Shift your position instead of overextending your reach, and avoid reaching above shoulder height.



Figure 7. Identifying the location of tension and compression wood in a trunk will make it easier to buck without binding the saw bar.

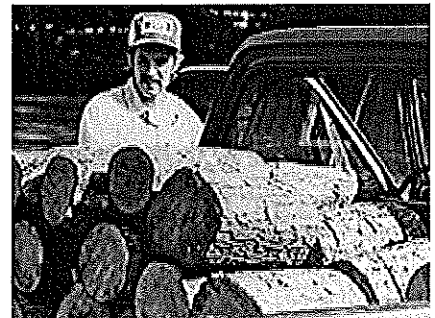


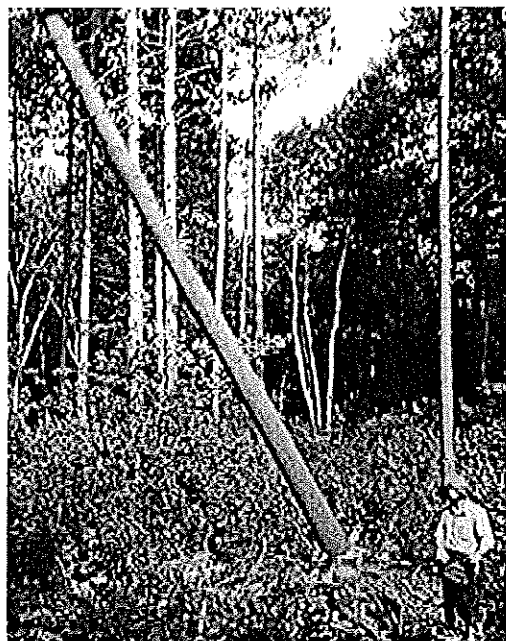
Figure 8. The reward for a productive and safe day in the field operating a chainsaw.

Kickback hazards can be reduced by staying conscious of the factors that make it possible. A correct position of the left hand, with the thumb wrapped *around* the handlebar, provides the operator with a more secure grasp of the saw.

While sawing, keep your eye on the tip, or "kickback zone" of the bar. This is where the cutting teeth can take an oversized bite and transfer the saw's power upward toward the operator. Kickback can also occur if the tip strikes another object such as a rock or debris. Keep your saw operating at peak efficiency by sharpening the chain often and, if it has a chain brake, testing and adjusting it regularly. Your owner's manual will point out any special attention your saw needs.

Before you make your first felling cut, there are at least twelve things to consider: lean, branch distribution, clear work area, spot to fell the tree, escape route, location of buddy, location of vehicle, presence of power lines, appropriate cutting technique, presence of rot, wind speed and direction, and any overhead hazards which, if they fall, are known as "widowmakers."

If you are not very experienced, start on smaller trees to learn and practice the basic felling cuts. Avoid going out when you are physically or mentally fatigued and don't go out alone. Take along a responsible adult to assist you and to provide emergency help if necessary. Remember to avoid felling a tree if it is a difficult case. Secure an experienced helper or hire a professional for dangerous work. Finally, make accident prevention a personal goal. The most important piece of safety equipment goes *under* your skin ... your attitude.



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Consumer Product Safety Commission

Chain Saw Kickback Hazard

CPSC Document #5011

Chain saw kickback can result in serious injury or death to the person operating the saw. Kickback most often occurs when the saw chain moving around the nose of the guide bar accidentally touches another object such as a log, branch or twig. Contact like this can throw the chain saw violently back toward the operator. In 1982, kickback was involved in an estimated 24,000 medically attended injuries to chain saw users.

Recent improvements in the design of saw chains have led to the production of low kickback consumer replacement chains which are capable of reducing chain saw kickback. Generally speaking, there is a low kickback replacement chain for virtually every chain saw, old and new alike. The Commission strongly recommends that you have your dealer or retailer determine whether your saw is equipped with one of these new chains. If your saw is not equipped with it, have the retailer install a new low kickback consumer replacement chain so that you enjoy the added protection every time you or someone else uses the chain saw.

If you are shopping for a new chain saw, look for the safety features found on many new chain saws: low kickback saw chain...hand guard...safety tip...chain brake...vibration reduction system...spark arrestor on gasoline models...trigger or throttle lockout...chain catcher...and bumper spikes.

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Send the link for this page to a friend! The U.S. Consumer Product Safety Commission is charged with protecting the public from unreasonable risks of serious injury or death from more than 15,000 types of consumer products under the agency's jurisdiction. Deaths, injuries and property damage from consumer product incidents cost the nation more than \$700 billion annually. The CPSC is committed to protecting consumers and families from products that pose a fire, electrical, chemical, or mechanical hazard or can injure children. The CPSC's work to ensure the safety of consumer products - such as toys, cribs, power tools, cigarette lighters, and household chemicals - contributed significantly to the 30 percent decline in the rate of deaths and injuries associated with consumer products over the past 30 years.

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Consumer Product Safety Commission

Riding Lawnmowers

Document #588

While homeowners generally rely on walk-behind power lawnmowers to cut small plots of grass, many suburban and country residents with large lawns have automated their grass-cutting chores out of necessity. With lots of grass needing to be cut each week, rural homeowners have come to rely on riding mowers, lawn tractors, and garden tractors as indispensable machines for maintaining the landscape. Aside from cutting large swaths of grass, some machines also accommodate a host of attachments to make quick work of otherwise cumbersome garden projects.

Although many thousands of homeowners have driven these mowers and tractors for years without mishap, others haven't been as fortunate. Hazards most often associated with riding equipment are blade contact and loss of stability. The U.S. Consumer Product Safety Commission estimates that 18,000 consumer injuries related to riding mower mishaps were treated in hospital emergency rooms in 1986. Between 1983-1986, there were an estimated 75 deaths each year related to riding mower, lawn tractors and garden tractor accidents.

Fatal accidents have several common patterns: the machine tips over, the victim falls under or is run over by the machine (accidents involving young children fall in this category), or the victim is thrown from or falls off the machine. The risk of an accident with a ride-on mower is almost twice the chance of a mishap with a walk-behind rotary mower.

Many new riding mowers and tractors will have new safety features not found on older machines. Under new provisions of a voluntary safety standard which took effect for units made after July, 1987, the following features have been incorporated into new equipment:

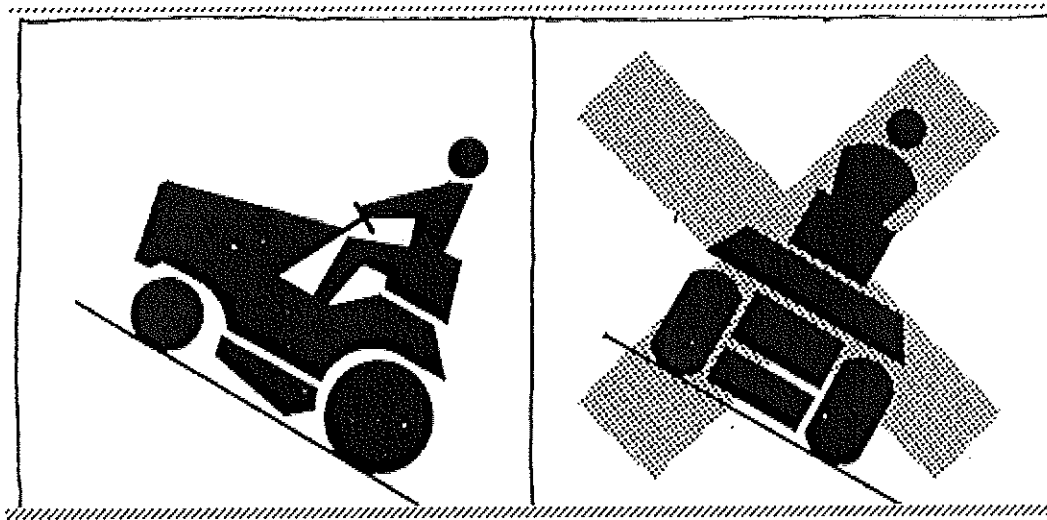
- **Operator Presence Control.** This device will stop the rotary blades if the operator leaves the control position of the riding mower or tractor without first disengaging the blade drive. This safety feature will reduce the chance of injury if the operator leaves the control position to unclog the discharge chute or perform some other activity without first stopping the mower blade(s).
- **Increased seatback height.** New machines have seatbacks of at least 4 1/2 inches to help the operator maintain a safe position on the machine.
- **Dynamic turn and sudden traction performance limits** have been added to improve machine stability.

If you are shopping for a new machine, a label certifying that the mower or garden tractor meets the 1986 ANSI 871.1 standard indicates that machines have these safety features.

SAFE OPERATING PRACTICES FOR RIDE-ON MOWERS

I. General Operation.

This cutting machine is capable of amputating hands and feet and throwing objects that are hit by the blade. Failure to observe the following safety instructions could result in serious injury or death to the operator and/or bystander.



1. Read, understand, and follow the safety and operating instructions that are in the manual and on the unit.
2. Allow only responsible adults who are familiar with the instructions and with proper operating procedures to operate the machine.
3. Clear the mowing area of objects such as rocks, toys, wire, etc., which could be picked up and thrown by the blade.
4. Be sure the area is clear of other people before mowing. Stop the mower if anyone enters the area.
5. Never carry passengers.
6. Do not mow in reverse unless absolutely necessary. Bring the machine to a full stop before shifting to reverse. Always look behind before and while operating in reverse.
7. Be aware of the discharge direction and do not point it at anyone.
8. Slow down before turning.
9. Never leave a running machine unattended. Always turn off the blades, set the parking brake, stop the engine, and remove the keys before dismounting.
10. Turn off blades and attachments when not mowing.
11. Stop the engine before removing the grass catcher or unclogging the chute.
12. Mow only in daylight or good artificial light.
13. Do not operate the machine while under the influence of alcohol or drugs.
14. Watch for traffic when operating near or crossing roadways.

II. Slope Operation

Slopes are a major factor related to tipover and loss of control accidents, which can result in severe injury or death. All slopes require extra caution. If you cannot back up the slope or if you feel uneasy on it, do not mow it.

DO

- Mow up and down slopes, not across.
- Remove obstacles such as rocks, downed tree limbs, etc.

- Watch for holes, ruts or bumps. Uneven terrain could cause the mower to overturn. Tall grass can hide obstacles. Use slow speed. Shift into a lower gear before going on a slope. Choose a low enough gear so that you will not have to stop or shift while on the slope.
- Follow the manufacturer's recommendations for wheel weights or counterweights to improve stability.
- Use extra care with grass catchers or other attachments. These can change the stability of the mower.
- Empty grass catcher bags when they are only partially full.
- Keep all movement on slopes slow and gradual. Avoid sudden changes in speed and direction.
- Avoid starting or stopping on a slope. If tires lose traction, disengage the blades, and proceed slowly straight down the slope.

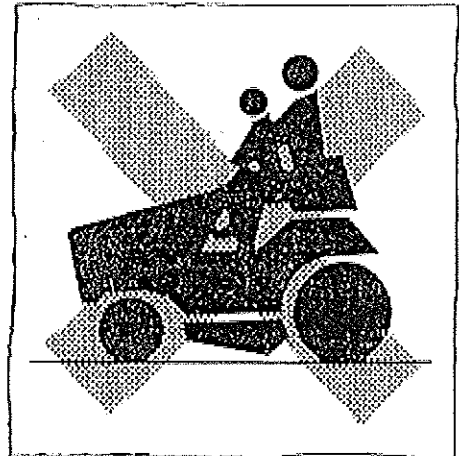
DO NOT

- Do not turn on slopes unless unavoidable; then, with the blades) disengaged, turn slowly and gradually downhill.
- Do not mow near dropoffs, ditches, or embankments. A wheel over the edge or an edge caving in could cause sudden overturn.
- Do not mow on wet grass. Reduced traction could cause sliding.
- Do not try to stabilize the machine by putting your foot on the ground.
- Do not use a grass catcher on steep slopes or rough terrains.

III. Children.

Tragic accidents can occur if the operator is not alert to the presence of children. Children are often attracted to the mower and the mowing activity. **Never** assume that children will remain where you last saw them.

1. Keep small children out of the mowing area, preferably indoors under the watchful care of an adult other than the operator.
2. Be alert and turn the mower off if children enter the area.
3. Before and when operating in reverse, look behind and down for small children.
4. Never carry children. They may fall off and be seriously injured or interfere with safe mower operation.
5. Never allow children to operate the mower.
6. Use extra care when approaching corners, shrubs, and trees.



IV. Service

1. Use extra care in handling gasoline. It is flammable, and the vapors are explosive.
 - A. Use only an approved container.
 - B. Never remove the gas cap or add fuel with the engine running. Allow the engine to cool before refueling.
 - C. Never refuel the machine indoors.
 - D. Never store the machine or gasoline container inside the house where there is an open flame, such as a gas water heater.
 - E. Always clean up spilled gasoline.
2. Never run a machine inside a closed area without good ventilation.
3. Keep nuts and bolts, especially blade attachment bolts, tight and keep equipment in good condition.
4. Never tamper with safety devices. Check their operation regularly.
5. Keep the machine free of grass, leaves, and oil build-up to prevent fire.
6. Stop and inspect the equipment if you strike an object. Repair if necessary before restarting.
7. Never make adjustments or repairs with the engine running.
8. Grass catcher components are subject to damage and deterioration. To reduce the thrown object hazard, periodically check and replace with manufacturer's recommended parts, when necessary.

9. Mower blades are sharp and can cut. Wrap the blades or wear gloves and use extra caution when servicing them.
10. Check brake operation frequently. Adjust and service as required.

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Consumer Product Safety Commission

Commission Issues Pressure Washer Warning

CPSC Document #5069

A 53-year-old man was electrocuted recently while using an electric pressure washer to wash a truck. This incident has prompted the U.S. Consumer Product Safety Commission to reissue a consumer alert about these products.

Pressure washers are devices that are hooked up to a plumbing connection. They pump water under high pressure through a hose, sometimes mixing the water with a cleaning solution. Pressure washers may be used to wash farm equipment, motor vehicles, outdoor power equipment, porches, or houses.

The Commission warns that consumers could receive a fatal electrical shock from pressure washers if the power cord connections become wet or an internal short exists. At least 13 such fatalities have been reported to the Commission to date, including incidents in Iowa, Louisiana, Minnesota, Alabama, and Illinois.

One incident involved a 3-year-old boy who was killed when he contacted a pressure washer being used by his father.

Since pressure washers are used to spray water, the power cord, washer, and consumer are often in contact with water. This can be a fatal combination, especially if the machine is not properly grounded.

It is important not to defeat a proper ground connection. Consumers should not use "adapter plugs" to connect the three-wire plug to a two-prong household receptacle without properly grounding the adapter plug. Consumers should have three-wire receptacles checked by a competent person to assure that they are properly wired for grounding. Even when the machine is in good mechanical condition and properly grounded, care must be taken to avoid hazardous conditions. For example, power cord connections should never be allowed to lie in water.

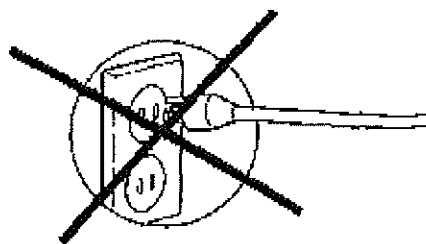
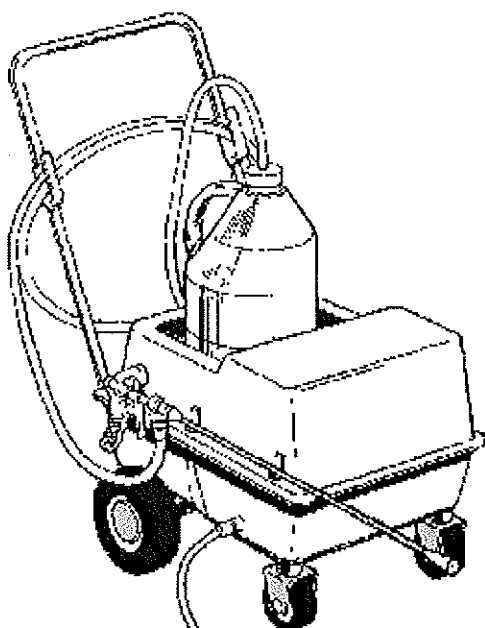
The 1987 edition of the National Electrical Code requires that pressure washers be protected by ground fault circuit interrupters (GFCIs). During the past few years the Underwriters Laboratories (UL) voluntary standard for pressure washers has undergone several changes to make the machines safer. UL is in the process of adding a new provision that will require that most pressure washers be equipped with built-in GFCIs. However, it may be several years before all pressure washers subject to the UL revisions are available with GFCIs.

For electric pressure washers, without built-in GFCIs, the Commission recommends that electrical circuit being using protected by either a circuit breaker type GFCI or a receptacle type GFCI. If none of the available circuits is protected by a GFCI, portable GFCIs can be purchased at some retail Outlets. Be sure to test the GFCI, before using the pressure washer.

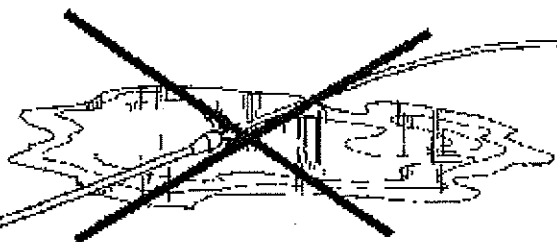
NEVER allow children to operate a pressure washer. Keep children at a safe distance when an adult is using a pressure washer.

The Commission also recommends the following precautions, particularly if no GFCI is available:

- Always plug a three-wire grounded pressure washer into a properly grounded receptacle.
- If an extension cord must be used, keep the power cord connection out of any standing water, and use a heavy duty, three-wire, properly grounded type. Keep the connection as far away as possible from the item being washed and away from any water runoff.
- Wear rubber-soled footwear that provides some insulation when operating the pressure washer.
- **NEVER** cut or splice the power cord or extension cords.
- **NEVER** remove the grounding prong from the power cord plug!
- **NEVER** operate the pressure washer after it has tripped a ground fault interrupter or circuit breaker without first having it examined for electrical faults by a competent repair person.



NEVER remove or bypass the ground pin on a three-pronged plug in order to insert it into a non-grounding outlet.



NEVER allow the connection between the machine's power cord and the three-wire, grounded extension cord to lie in water

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Consumer Product Safety Commission**Weed Trimmers Can Throw Objects and Injure Eyes**CPSC Document #5108

Power grass/weed trimmers can throw stones, sticks, and other objects. These objects can injure the eyes of operators and those nearby. The U.S. Consumer Product Safety Commission estimates that in 1989 there were approximately 4,600 hospital emergency room-treated injuries associated with power lawn trimmers or edgers. About one-third of the injuries were to the eye. Consumers should wear goggles to protect their eyes. Consumers also should clear the area of stones, sticks, wire, and other debris before using either a line or blade type weed trimmer.

**CAUTION**

- Power grass/weed trimmers can throw objects and injure eyes.
- Wear goggles to protect eyes.
- Clear away stones, sticks, and other debris before using.

009004

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Consumer Product Safety Commission**Safety Commission Warns About Eye Injuries From Welding**

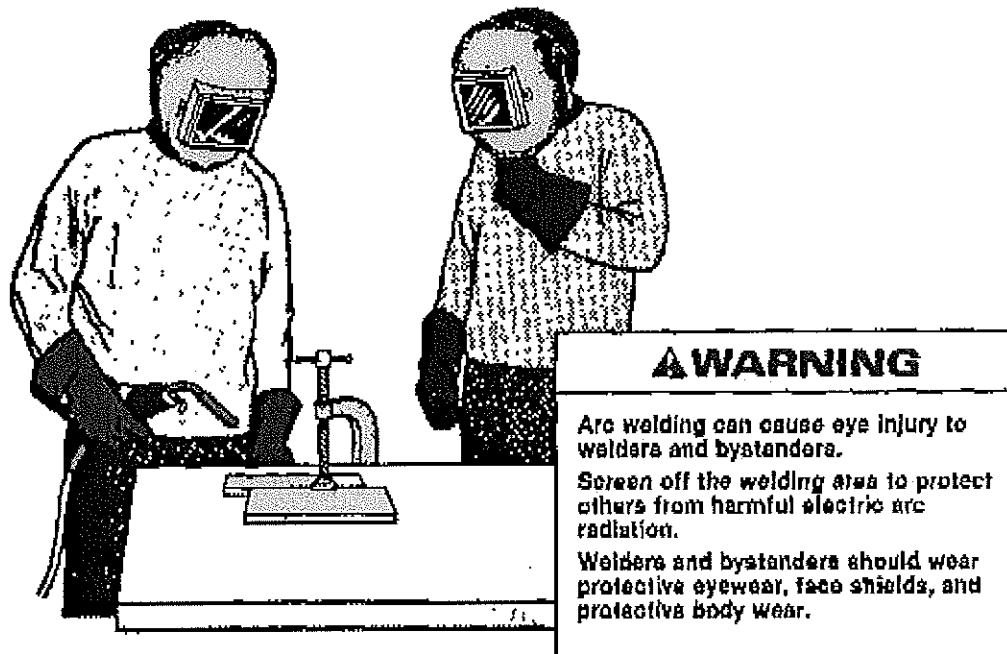
CPSC Document #5109

The US. Consumer Product Safety Commission estimates that 10,800 eye injuries related to welding equipment were treated in hospital emergency rooms in 1988 (the latest year for which information is available). Electric arc welding equipment was the product most frequently involved in eye injuries. Many of those injured were bystanders who were watching someone else use welding equipment. Eye damage can happen quite a distance away from the welding and does not require much more than a second to occur.

Most types of welding give off radiation that can burn the eye. The ultraviolet and infrared radiation given off from electric arc welding can cause painful and even more serious eye injuries. Such burns can be permanent and can threaten eyesight.

When welding, both the person doing the welding and any bystanders should wear protective face shields with filtered glass for protection against the glare of the electric arc.

Eye injuries from flying hot metal and slag particles may also be serious and need proper medical attention. Clear glass goggles or safety glasses with side shields should be worn under the face shield for protection immediately after welding when chipping with a hammer or brushing loose particles from the weld bead. All parts of the body should also be protected to prevent burns to other areas such as the neck, arms, body and legs.



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Consumer Product Safety Commission**Brushcutters Require Cautious Use by Consumers**CPSC Document #5005

Consumers are finding a relatively new type of power tool on the market for yard and garden work-brushcutters and combination trimmer/brushcutters. While the product is somewhat similar to the flexible string weed trimmer, it has a much greater potential for serious and disabling injury. The brushcutter uses a rigid cutting blade in place of the flexible plastic string line. The blade, made of steel or rigid plastic materials, permits the cutting of much heavier stands of brush and small diameter saplings, according to manufacturers. However, it can also cut through a hand, arm, or leg, something the flexible line trimmer will not do.

Several injury reports received by the Consumer Product Safety Commission (CPSC) indicate the blade has caused severe lacerations and near amputations. These accidents have happened even to professionals using the product.

In one case, a man was cutting brush along the bottom of a board fence. His wife, standing nearby trimming a hedge, was severely injured when he lost control and the brushcutter swung in an arc toward his wife. The blade cut into the wife's thigh and then her left hand, nearly amputating it below the wrist. In another incident, two workers were cutting brush. One held down a sapling with an axe, while the other attempted to cut through it with a brushcutter. The blade ricocheted off the sapling and into the assistant, severely cutting his right arm. In another case, a man cutting brush near a chain link fence reported that the blade threw a small piece of wire from the fence into his eye. In another case, the blade was reported to have come off the end of the shaft while it was being operated, causing a foot injury.

While only a few reports of injury have been received to date, the Commission's staff believes there may be many more injuries if extra caution is not taken in using the product. The greatest danger appears to be to bystanders or helpers. Users should read and observe safety and operating instructions in the owner's manual.

Among the safety precautions the user should take are:

- Keep all people away from the operator during use. At least one manufacturer recommends keeping people, including helpers, a minimum of 30 feet away.
- Before starting, make sure the blade is properly secured to the shaft. Replace damaged blades. - Avoid cutting close to fences, sides of buildings, or other such obstacles that could cause the brushcutter to ricochet. Clear the work area of trash or hidden debris that could be thrown back at the operator or at a bystander.
- Use the proper cutting attachment for the job. Use the flexible string trimmer or hand tools for cutting near buildings, fences, etc., where the rigid blade may cause damage and injury.
- Wear protective clothing, including safety eye goggles.

Please call the CPSC toll-free hotline on 800-638-CPSC to report an injury with this type of product or to request information on power equipment. A teletypewriter number for the hearing impaired is 800-638-8270.

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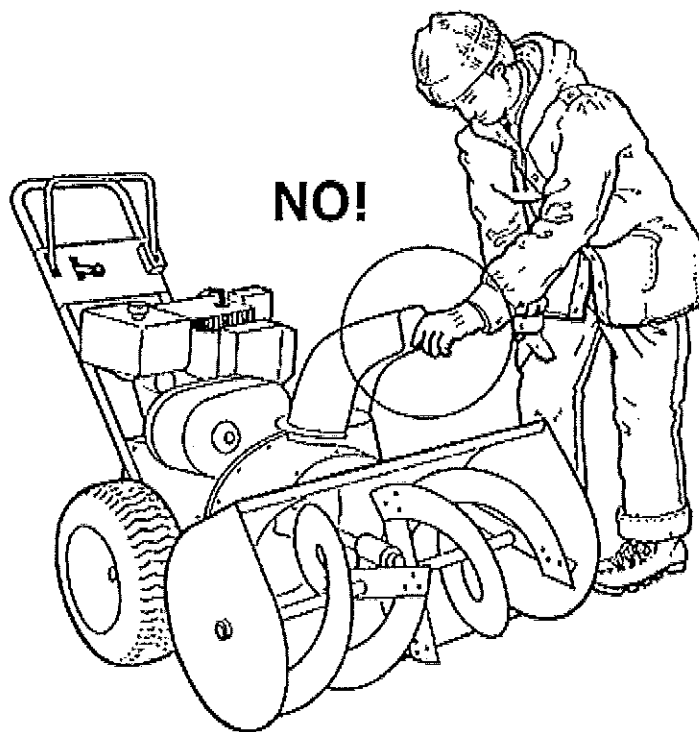
Consumer Product Safety Alert

FROM THE U.S. CONSUMER PRODUCT SAFETY COMMISSION, WASHINGTON, D.C. 20207

Snow Thrower Safety Alert

The U.S. Consumer Product Safety Commission (CPSC) wants you and your family to be safe using snow throwers. In a recent year, there were approximately 590 finger amputations involving snow throwers. CPSC estimates that each year on average there are approximately 5,740 hospital emergency room-related injuries associated with snow throwers. CPSC has received reports of deaths since 1992 involving snow throwers. Two people died after becoming caught in the machine. Five deaths were caused by carbon monoxide poisoning resulting from leaving the engine running in an enclosed area.

Injuries most frequently occurred when consumers tried to clear the auger/collector or discharge chute with their hands.



Most snow thrower injuries happen when consumers try to clear snow from the discharge chute or debris from the auger/collectors. Always stop the engine before attempting to clear snow and debris from any part of the snow thrower.

CPSC offers the following safety tips for using snow throwers:

- Stop the engine and use a long stick to unclog wet snow and debris from the machine. Do not use your hands to unclog a snow thrower.
- Always keep hands and feet away from all moving parts.
- Never leave the machine running in an enclosed area.

- Add fuel to the tank outdoors before starting the machine; don't add gasoline to a running hot engine. Always keep the gasoline can capped, and store gasoline out of the house away from ignition sources.
- If you have an electric-powered snow thrower, be aware of where the power cord is at all times.

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